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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/742,433	12/22/2000	Tomoyuki Hiroki	35.G2698	8881

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EXAMINER	
ZERVIGON, RUDY	

ART UNIT	PAPER NUMBER
1763	

DATE MAILED: 03/24/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/742,433	HIROKI, TOMOYUKI	
	Examiner	Art Unit	
	Rudy Zervigon	1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 December 2003*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-7* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

2. Claims 1-4, and 7 are rejected under 35 U.S.C. 102(b) as being anticipated by Yoshinao Miyata (USPat. 5,992,974). Yoshinao Miyata teaches a method ("Detailed Description") of manufacturing a liquid jet recording head (Fig.5h) which comprises an element substrate ("silicon monocrystal"; 40; Figures 5(a)-5(h); column 6, lines 21-28) provided with a plurality of discharge energy generating elements (44, 47, 45; column 6, lines 47-50) for applying discharge energy (column 3, lines 34-41) to a recording liquid in accordance with image data (column 2, lines 13-45, abstract). Yoshinao Miyata further teaches:

i. a liquid chamber (2, Figures 5(e)-5(g))

ii. a top plate (6,40, Figures 5(a)-5(h)) having a plurality of nozzles (7) and made from silicon wafer having a <110> orientated surface (column 3, lines 41-48)

iii. the top plate (6,40, Figures 5(a)-5(h)) and the element substrate are "jointed" (column 7, lines 49-53) so that each of the discharge energy generating elements face the respective nozzle (7, Figure 5(h))

iv. a mask layer ("protecting layer", 41; column 8, lines 20-27) provided on a nozzle surface (lower surface of 6, Figure 5(a) and 5(h)) of the top plate (6,40, Figures 5(a)-5(h))

v. compensation patterns ("supply ports" 61, 4,; Fig.7(a), 5(f), 5(g); "ink reservoirs" 3, 51,; Fig.7(a), 5(f), 5(g); 41, 41', 41''; Figures 5(d)-5(g); 6, Figure 2, 5(h)) extending to a

liquid chamber (2, Figures 5(e)-5(g)) region in order to from the nozzles and the liquid chamber (2, Figures 5(e)-5(g)) by anisotropic etching (claim 8; column 5, lines 17-23)

vi. steps for performing anisotropic etching of the top plate (6,40, Figures 5(a)-5(h)) through the mask layer ("protecting layer", 41; column 8, lines 20-27) and forming the liquid chamber (2, Figures 5(e)-5(g)) to have a substantially rectangular shape at the nozzle surface of the top plate by over-etching portions with the compensation patterns ("supply ports" 61, 4,; Fig.7(a), 5(f), 5(g); "ink reservoirs" 3, 51,; Fig.7(a), 5(f), 5(g); 41, 41', 41''; Figures 5(d)-5(g); 6, Figure 2, 5(h)) – column 7, line 65 – column 8, line 6

vii. compensation patterns ("supply ports" 61, 4,; Fig.7(a), 5(f), 5(g); "ink reservoirs" 3, 51,; Fig.7(a), 5(f), 5(g); 41, 41', 41''; Figures 5(d)-5(g); 6, Figure 2, 5(h)) are comb-shaped (Figure 7(a)) and are arranged to oppose each other so as to define a ladder-shaped opening region between the compensation patterns ("supply ports" 61, 4,; Fig.7(a), 5(f), 5(g); "ink reservoirs" 3, 51,; Fig.7(a), 5(f), 5(g); 41, 41', 41''; Figures 5(d)-5(g); 6, Figure 2, 5(h)) at the center portion (7) of the liquid chamber (2, Figures 5(e)-5(g)) region

viii. compensation patterns ("supply ports" 61, 4,; Fig.7(a), 5(f), 5(g); "ink reservoirs" 3, 51,; Fig.7(a), 5(f), 5(g); 41, 41', 41''; Figures 5(d)-5(g); 6, Figure 2, 5(h)) are arranged to oppose each other so as to define a substantially H-shaped opening region between the compensation patterns ("supply ports" 61, 4,; Fig.7(a), 5(f), 5(g); "ink reservoirs" 3, 51,; Fig.7(a), 5(f), 5(g); 41, 41', 41''; Figures 5(d)-5(g); 6, Figure 2, 5(h)) at the center portion (7) of the liquid chamber region

ix. a step of performing anisotropic etching (column 7, line 65 – column 8, line 6) of the top plate (column 3, lines 41-54) using the compensation patterns ("supply ports" 61, 4,;

Fig.7(a), 5(f), 5(g); "ink reservoirs" 3, 51,; Fig.7(a), 5(f), 5(g); 41, 41', 41''; Figures 5(d)-5(g); 6, Figure 2, 5(h)) as a mask so that:

a. to top plate is over-etched (7; Fig.5(h))

b. the liquid chamber having a substantially rectangular shape (Fig.5(h)) at the nozzle surface of the top plate is formed

x. the compensation patterns ("supply ports" 61, 4,; Fig.7(a), 5(f), 5(g); "ink reservoirs" 3, 51,; Fig.7(a), 5(f), 5(g); 41, 41', 41''; Figures 5(d)-5(g); 6, Figure 2, 5(h)) extending into the liquid chamber (2, Figures 5(e)-5(g)) are removed (voids 61,7,51; Fig.7(a) resulting from etching) after the liquid chamber (2, Figures 5(e)-5(g)) is formed, as claimed by claim 7

Claim Rejections - 35 USC § 103

3. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

4. Claims 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshinao Miyata (USPat. 5,992,974). Yoshinao Miyata is discussed above. Yoshinao Miyata further teaches compensation patterns (6,7; Figure 2) "lines" (interpreted as vertices) having an angle of 35° (both sides) relative to the <111> plane in the nozzle direction of the silicon wafer (6; column 3, line 64). Yoshinao Miyata further teaches at least one line (line at "7"; Figure 2) parallel to the nozzle array direction, and the compensation patterns (7; Figure 2, 7(a)) are arranged to oppose each other (Figure 7(a)) separated by an opening region (51) in the center portion of the liquid chamber (2, Figures 5(e)-5(g)) region. Yoshinao Miyata does not teach

"lines" having angles of 55° and 71° relative to the <111> plane in the nozzle direction of the silicon wafer.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to optimize Yoshinao Miyata's 35° angle formed between a compensation pattern line and the <111> plane of the silicon wafer to 55° and 71° in the nozzle direction of the silicon wafer.

Motivation to optimize Yoshinao Miyata's 35° angle formed between a compensation pattern line and the <111> plane of the silicon wafer to 55° and 71° in the nozzle direction of the silicon wafer is to optimize directional flow rate of the ejected ink.

Response to Arguments

5. Applicant's arguments with respect to claims 1-7 have been considered but are moot in view of the new grounds of rejection. Specifically, Applicant's definitions of "top plate", and "mask" in view of the specification and arguments filed December 30, 2003 have necesitated a new ground of rejection as detailed above.

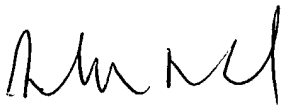
Conclusion

6. Applicant's amendment necessitated the new grounds of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period

will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Rudy Zervigon whose telephone number is (571) 272.1442. The examiner can normally be reached on a Monday through Thursday schedule from 8am through 7pm. The official after fax phone number for the 1763 art unit is (703) 872-9306. Any Inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Chemical and Materials Engineering art unit receptionist at (571) 272-1700. If the examiner can not be reached please contact the examiner's supervisor, Gregory L. Mills, at (571) 272-1439.



JEFFRIE R. LUND
PRIMARY EXAMINER